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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 2_COD_Question 1

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

Your task is to create a program to manage a playlist of items. Each item is represented as a character, and you need to implement the following operations on the playlist.

Here are the main functionalities of the program:

Insert Item: The program should allow users to add items to the front and end of the playlist. Items are represented as characters.Display Playlist: The program should display the playlist containing the items that were added.

To implement this program, a doubly linked list data structure should be used, where each node contains an item character.

Input Format

The input consists of a sequence of space-separated characters, representing the items to be inserted into the doubly linked list.

The input is terminated by entering - (hyphen).

Output Format

The first line of output prints "Forward Playlist: " followed by the linked list after inserting the items at the end.

The second line prints "Backward Playlist: " followed by the linked list after inserting the items at the front.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: a b c -
Output: Forward Playlist: a b c
Backward Playlist: c b a

Answer

```
#include <stdio.h>
#include <stdlib.h>

struct Node {
   char item;
   struct Node* next;
   struct Node* prev;
};


void insertAtEnd(struct Node** head, char item) {
      struct Node* new1 = (struct Node*)malloc(sizeof(struct Node));
         new1->item = item;
            new1->next = NULL;
               new1->prev = NULL;

                  if (*head == NULL) {
                           *head = new1;
                  } else {
```

```
                struct Node* tail1 = *head;
                    while (tail1->next != NULL) {
                        tail1 = tail1->next;
                    }
                    tail1->next = new1;
                        new1->prev = tail1;
            }
}

// Function to display the list forward
void displayForward(struct Node* head) {
    struct Node* temp = head;
        while (temp != NULL) {
            printf("%c ", temp->item);
                temp = temp->next;
        }
            printf("\n");
}

// Function to display the list backward
void displayBackward(struct Node* head) {
    struct Node* temp = head;

        // Go to the last node
            if (temp == NULL) return;
                while (temp->next != NULL) {
                    temp = temp->next;
                }

                // Print from last to first
                    while (temp != NULL) {
                        printf("%c ", temp->item);
                            temp = temp->prev;
                    }
                        printf("\n");
}

// Function to free the entire playlist
void freePlaylist(struct Node* head) {
    struct Node* temp;
        while (head != NULL) {
            temp = head;
```

```
            head = head->next;
            free(temp);
        }
}


int main() {
    struct Node* playlist = NULL;
    char item;

    while (1) {
        scanf(" %c", &item);
        if (item == '-') {
            break;
        }
        insertAtEnd(&playlist, item);
    }

    struct Node* tail = playlist;
    while (tail->next != NULL) {
        tail = tail->next;
    }

    printf("Forward Playlist: ");
    displayForward(playlist);

    printf("Backward Playlist: ");
    displayBackward(tail);

    freePlaylist(playlist);

    return 0;
}
```

Status : Correct ***Marks : 10/10***